INTREPID batch processing (G19)

Top

The guided tours up to now have concentrated on the interactive use of INTREPID.

INTREPID also provides powerful batch operation through the use of **task specification files.** This is referred to as **job** files for our historic "PARMS" block structured language.

Protobuf

With the release of V5.0 INTREPID, a complete new world of batch processing technology is also being co-released, with guarenteed duplication of functionality for all tools. Our test system in fact contains many exactly duplicate jobs, this time expressed in the new GOOGLE protobuf syntax., to verify that the same process can be reproduced using the new syntax. So why change?

Well, firstly, INTREPID gets to publish the formal task specification language to all our users, so it is comepletely unambiguous. This is done in the API section of the product distribution. These *.proto files completely encapulate the data model used to specify each and every option, process and message. These files are guarenteed to be exactly the same as those used to build the batch engine indise the delivered system.

Secondly, INTREPID is relieved of the job of writing parsers and validation code, to tell you what you have or have not done wrong, in creating the task files. All thet is required is a minimal amout of "glue" code to pick up the parameter settings, and pass them into the tool. GOOGLE kindly have put all this technology in the public domain, and what they have gifted is very close to our internal designs, so once it was realised how close it is in spirit and intent to the internally developed system, only much better, it took very little time time to decide to migrate to the GOOGLE technology. typically, it took about one day to convert an existing tool over to also use this technology, including the duplication of the test system.

And finally, the Eclipse framework also has support for protobufs, so the whole business of buoilding and maintaining a formal specification of all the processes can be streamlined, and then more easily understood by even relatively inexperienced code developers. This also applies to any enthusists who wish to use the INTREPID specifications that cover all of the Geomodeller and Intrepid tool set. If you have Eclipse, you can get GOOGLE protobuf plug-in, and off you go. Python binding, Java and C++ are all available.

Parms Blocks

Most INTREPID tools can save the current working parameters (Save Options) to a job file. Most tools will also load a set of working parameters (Load Options) from an existing job file. In addition, you can execute job files independently of the interactive tool, using a special batch language command.

Job files are simple block structured ASCII text files that define the inputs, outputs, parameters and operations required for INTREPID tasks. You can edit them using any text editor. The following illustration shows a typical job file which is being viewed in the ProjectManager display panel. As the job/task files are simple ASCII files, and text editor can be used to modify the syntax.

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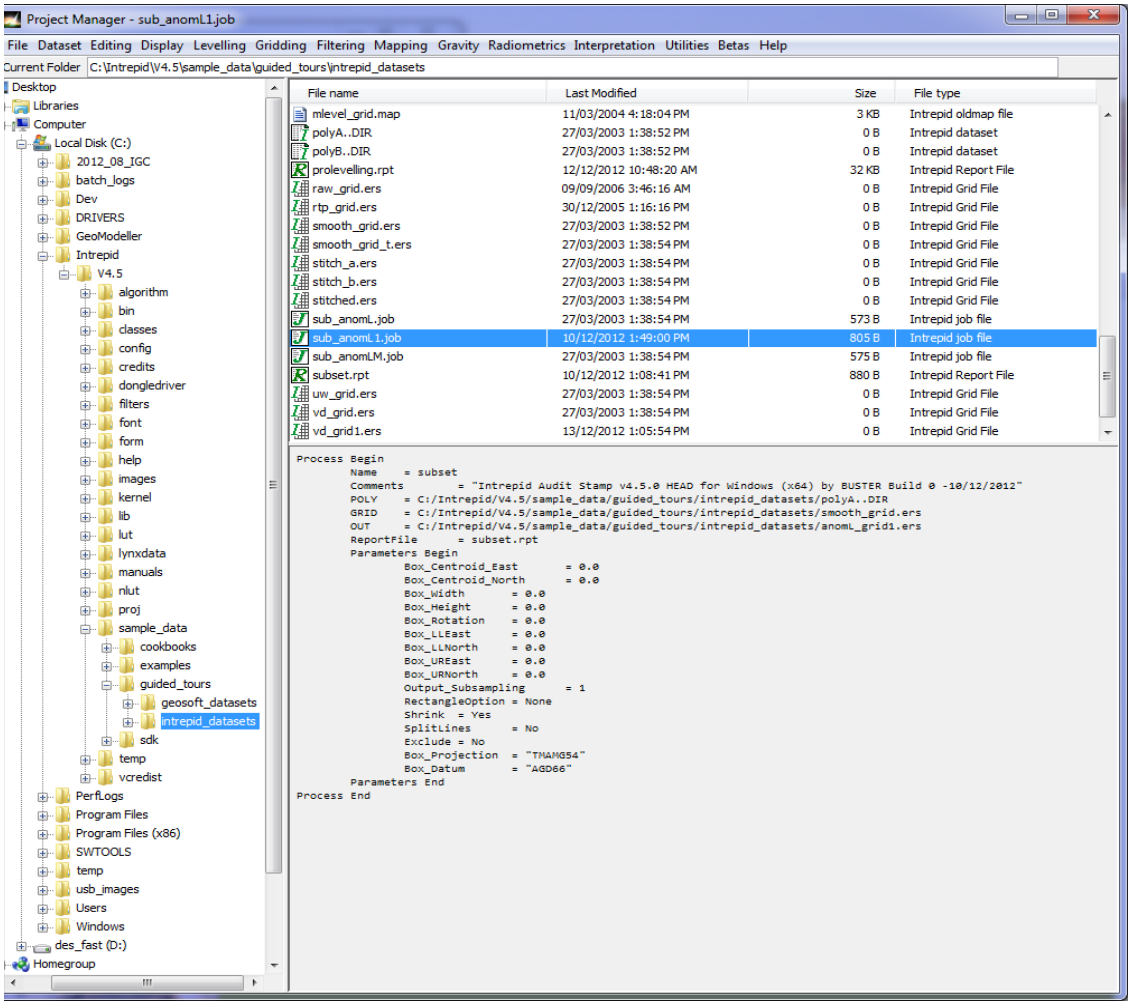

In this guided tour you will use a text editor to make a copy of an existing job file, then rapidly perform the new task as a batch process in INTREPID.

Overview

- The INTREPID batch mode and task specification (job) file system can greatly streamline your data processing work.
- You can load job files into interactive tools instead of using menus and dialog boxes to specify the task parameters.
- You can execute tasks in INTREPID batch mode using job files.
- Job files are in ASCII text format and use a simple task specification language.
- The V5.0 syntax is also introduced via an example protobuf specfication file and a sample task file.

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Creating job files

You can create a job file by

- Using the Save Options command which is available in most INTREPID tools
- Using a text editor to modify an existing job file.
- Edit the **`History`** file to recover the 'job'.

Duplicating and editing job files

In many cases you will wish to carry out similar but not identical tasks. In this case you can duplicate a job file by

- Making a copy and editing the copy using any text editor (e.g., *Windows NotePad* or *vi* under *UNIX*).
- Alternatively you can load an existing job file into an INTREPID interactive tool and use the menus and dialog boxes to adjust only the parameters you wish to change.

Using job files

You can use INTREPID's powerful task specification (job) file system in two ways:

- You can execute the task specified by one of these files in INTREPID batch mode. You can do this using a command window.
- You can load a job file into an INTREPID interactive tool instead of manually specifying the files, parameters and operations.

Job files are particularly useful when you have repetitive 'production line' tasks. You can resubmit or reload a job file repeatedly without needing to use menus and dialog boxes.

You can further coordinate job files using operating system scripts, such as korn shell.

Several INTREPID tools also know a lot about job and task files, being able to parse macros embedded within the syntax, and executing repeat loops and paramter subsititutions as required. the principal tool for syupporting this extra functionality is the ProjectManager tool, or fmanager.exe. this tool is the backbone of the batch test system, as it can decide which tool to execute, and also how to asses the correct running, via comparing such things as the output statistics, against the previously known good results. Extra tools with this built in intelligence include invbatch.exe and gmbatch.exe

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Context of this guided tour

In the context of your data processing cycle, this tour describes creating a subsection of a grid dataset based on a subsectioning process performed on another grid earlier in the cycle. The new subsection will cover the same geographic region because it uses the same polygon dataset, but will use different input and output grid specifications.

Location of sample data for Guided Tours

We provide two complete sets of sample datasets, one in INTREPID format and one in *Geosoft* format. INTREPID works equally well with both formats. When you want to open a dataset, navigate to the directory containing the required data format.

Where ***install_path*** is the path of your INTREPID installation, the project directories for the *Guided Tours* sample data are ***install_path*\sample_data\guided_tours\intrepid_datasets** and ***install_path*\sample_data\guided_tours\geosoft_datasets**.

For example, if INTREPID is installed in **C:\Program Files\Intrepid\Intrepid4.5.nnn**, then you can find the INTREPID format sample data at **C:\Program Files\Intrepid\Intrepid4.5.nnn\sample_data\guided_tours\intrepid_datasets**

This is the default location for the sample data. If you have installed INTREPID normally, the data resides there. If you have installed INTREPID elsewhere, the exercises will work just as well. Just use the appropriate pathnames.

For more information about installing the sample data, see "Sample datasets—installing, locating, naming" in INTREPID Guided Tours Introduction (G01)

For a more detailed description of INTREPID datasets, see Introduction to the INTREPID database (G20). For even more detail, see INTREPID database, file and data structures (R05).

Location of sample data for CookBooks

Right next to the Guided tours data, is a rich set of more exotic geophysics datasets and grids, already prepared for the cookbook training sessions. A casual user might also gain some trial and error insights into the capbilities of the software, just by testing the Project Manger's ability to preview and describe the attributes of each of the cookbook datasets.

Should you complete this guided tour?

This guided tour is intended for intermediate level users. It describes an INTREPID process that requires precise editing of a text file and understanding of the concept of batch processing. If you are a beginner or wish only to have a brief overview of INTREPID's capabilities, you can omit this guided tour. Batch processing is, however, a very important and timesaving INTREPID process. You should not omit it from a thorough evaluation of INTREPID's capabilities.

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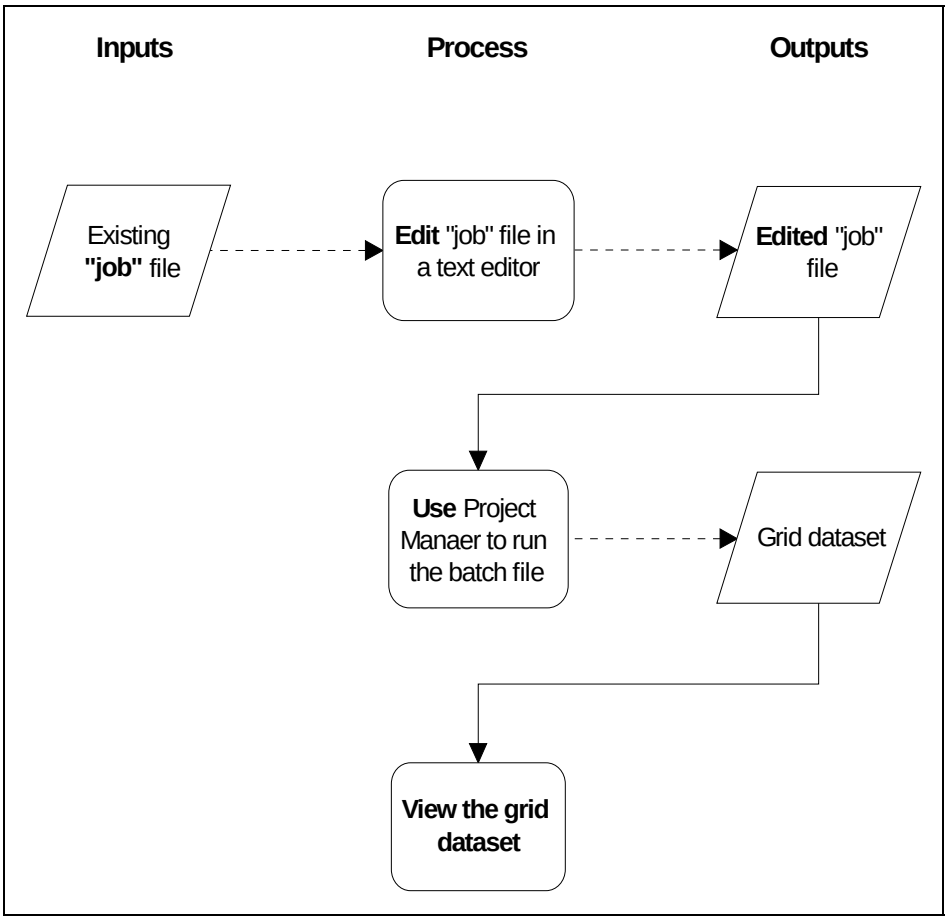
What you will do

Flowchart Summary



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Steps to follow

In Managing INTREPID datasets (G06), you created a job file called **sub_anomL1.job**. This job file would perform the subsectioning task described in that guided tour.

In this guided tour you will edit the job file to modify the task, then have INTREPID carry out the new task in its batch operation mode.

The existing job file uses the polygon dataset **polyA** to create a subsection of the grid dataset **smooth_grid**. The new grid dataset created by this process is called **anomL_grid**.

The new job file creates a subsection of the same size and location using the same polygon dataset (**polyA**). It creates the subsection from the microlevelled grid dataset **mlevel_grid**. The new grid dataset created by this process is called **L_mlev_grid**.

You will use **sub_anomL.job** (a solution file we have provided which is identical to **sub_anomL1.job**).

The following table summarises the changes you will make to the existing job file

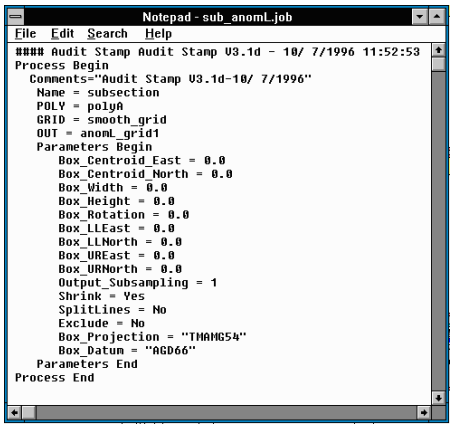
	Existing job file	New job file
Name of job file	sub_anomL.job	sub_anomLM1.job
Source grid dataset	smooth_grid	mlevel_grid
Polygon dataset	polyA	polyA
Target grid dataset	anomL_grid	L_mlev_grid1

Tip: *Job file names always have the extension* **.job**.

Load the job file into a text editor

1 *Load the* **file sub_anomL.job** *into a text editor.*

Launch the text editor of your choice, e.g., *Notepad* for *Windows* or *vi* under *UNIX*. Load the file **sub_anomL.job** from directory ***install_path*\sample_data\guided_tours\intrepid_datasets** into the text editor (or, preferably, make a copy of this file called **sub_anomLM1.job** before launching the text editor and edit the copy).



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Edit the job file

2 *Edit the file so that it inputs the grid* **mlevel_grid** *and produces the grid* **L_mlev_grid1**.

Modify the **Grid =** and **Out =** lines of the file so they read as shown in bold below.

```
#### Audit Stamp Audit Stamp V3.1d - 5/ 7/1996 12:22:39
Process Begin
 Comments="Audit Stamp V3.1d- 5/ 7/1996"
  Name = subsection
  POLY = polyA
  GRID = mlevel_grid
  OUT = L_mlev_grid1
  Parameters Begin
   Box_Centroid_East = 0.00
   ...
   Box_Projection = "TMAMG54"
   Box_Datum = "AGD66"
  Parameters End
Process End
```

If you load a job file that you have saved yourself it will contain relative paths for the input/output dataset names. For example:

```
  ...
  POLY = .\sample_data\guided_tours\intrepid_datasets
\polyA
  GRID = .\sample_data\guided_tours\intrepid_datasets
\mlevel_grid
  OUT = .\sample_data\guided_tours\intrepid_datasets
\L_mlev_grid1
```

Save the edited job file

3 *Save the edited job file as* **sub_anomLM1.job**.

Save the job file with the new name **sub_anomLM1.job** in directory ***install_path*\sample_data\guided_tours\intrepid_datasets\tutorials**. **Note:** Do not save the modifications back to the original file. Leave it in its original state for the next person who uses this guided tour.

Launch a command prompt

4 *Launch a command prompt window.*

Launch a command prompt. How you do this will depend on which operating system you are using. In *Windows*, either choose **Start > Programs > Accessories > Command Prompt**, or you can use **Start > Run** with the command **cmd.exe**.

Execute a job file in batch mode

5 *Execute the job file.*

At the command line prompt, type the command **fmanager -batch sub_anomLM1.job**.
This command instructs INTREPID to run **sub_anomLM1.job** as a batch process. Any INTREPID job file can be launched in this way.

INTREPID will execute the task in batch mode, creating the grid dataset **L_mlev_grid1**.

Every batch process will write a report, which can be inspected either while the process is running or after it has completed. This is the recommended way of monitoring the progress of the batch job. If you are running *UNIX/LINUX*, the report will go to the command window which is running the process. If you are running *Windows*, the report will be written to a log file.

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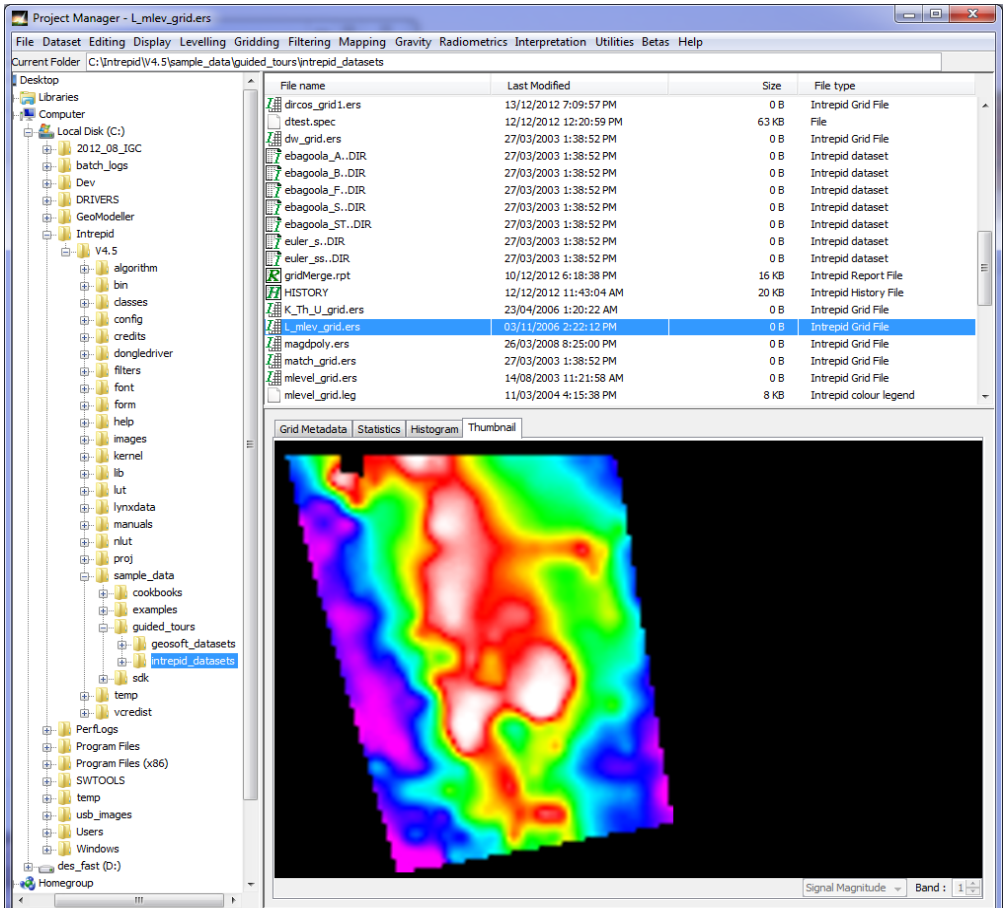
6 *Inspect the log file created by the batch process (optional).*

The actual name and location of the log file will vary depending upon which version of INTREPID you are using. Versions from 4.5 onwards create **`WINXX.`*`user`*`.log`**, where *`user`* is the user name of the person logged on, for example **`WIN32.chris.log`**. This file is created in the ***`install_path`*`/temp`** directory.

When INTREPID performs batch mode tasks, it does not display the interactive tool window or provide any other display of its progress until the task is complete, other than the log report or file, which can be viewed at any time while the process is executing.

View the resulting dataset

7 *Use a thumbnail tool to view the dataset* **`L_mlev_grid`** *(a solution dataset provided by us, which is identical to* **`L_mlev_grid1.ers`**



Extra Examples

With V4.5, INTREPID is delivering many more examples of more powerful processes involved with supporting tensors, vectors etc. The cookbook section of the sample_data, has a new tensors\ProcessSurveyJOBS directory with many examples of ways to do terrain corrections, grid, form the tensor, handle Falcon datsets etc etc. Whilst all of this is not comprehensively documented in these tours, the syntax, especially with V5.0, becomes a lot more self documenting. The example below is for a spreadsheet editor job to create a new Tensor field in an Oasis database, using the individual components.

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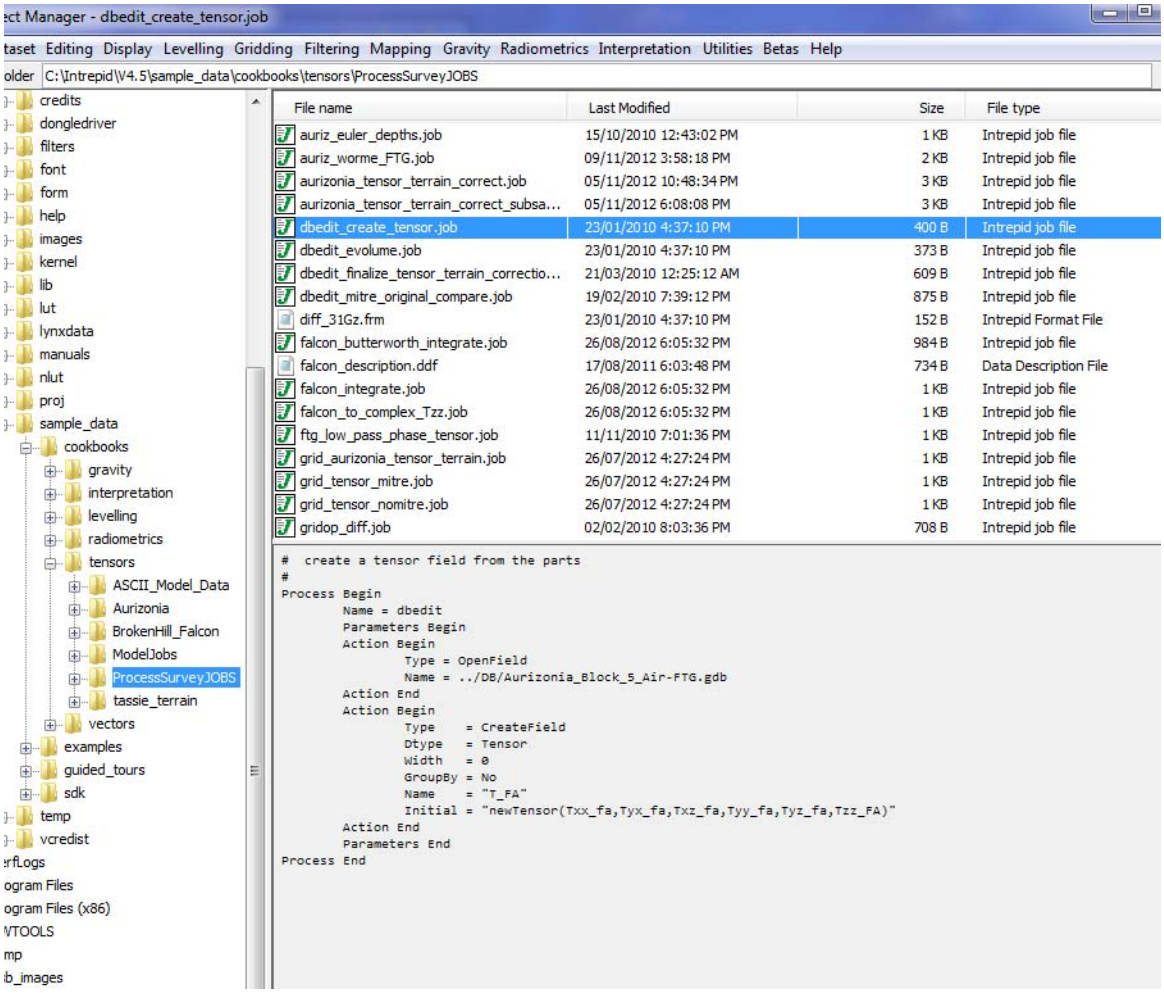

ProtoBuf Examples

The Aurizonia tensor grid integration example from the Spectral Filter guided tour, is repeated here as a V5.0 task file.

```
#
# Example task file - gfilt
#
# Perform integration on a FTG tensor grid to give best estimate
of Vertical component of gravity.
#  nb Falcon requires different options
# Usage: fmanager -batch auriz_Tensor_integrate.task
#
IntrepidTask {
     GridFilter {  # FTG data set from Brazil
          InputGridName:              "../datasets/
t_integrate.ers";
          FilteredGridName:     "../datasets/t1_gz.ers";
          Band:                       0;
          FftGridName:          "../datasets/t1_fft";
          OutputFftGridName:    "../datasets/t1_fft_out";
          #WindowedGridName:    "../datasets/t1_wind";
          #ExpandedGridName:    "../datasets/t1_exp";
          DetrendDegree:              0;         # silly to
detrend so dont.
```


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```
                InputGridCoordSysType: END;      #  Bell data, so left
            hand coords
                OutputPrecision:      IEEE4ByteReal;
                FillType:                  ARTHUR;
                RolloffType:          Cosine_RollOff;
                WindowType:           NO_Window;
                ReApplyTrendAfterReverseFft: false;
                ApplyMaskAfterReverseFft: true;
                CalculateTensorIntegration: true;
                ScaleTensorIntegration: true;    #  change the units
            from Eotvos to mGals
                InputTensorComponents: INT_XZ_YZ_ZZ;#  here is the
            specification of 3 inputs to produce the one output
            }}
```

The formal specification of the syntax for this GridFilter tool, is contained in a section of the "*intrepid_tasks.proto*" file. This reproduced below to show the tie in, to what you see above.

```
//##
//  primary tool for 2D FFT geophysical filtering
//  this tool is designed to primarily work in a cartesian map space
//  some support for working on spheroid is allowed, but you are advised to be very cautious
// you get to do this by using a grid that has geodetic projection
// TODO  flesh out the full filter description langauge options
message GridFourierFiltering_INT {
//  the input database and any relevant fields
        required string InputGridName=1;  // primary grid dataset to do work on!
        optional grid_subset_INT Subset = 3;  // use if you just want a subset of your gridded data
        optional GetRolloffTypeList RolloffType                    =4 [default = NO_RollOff];
        optional GetWindowTypeList WindowType                      =5 [default = NO_Window];
        optional GetFillTypeList FillType                    =6 [default = NO_Fill];
        optional bool FillStopAtEdge                               = 8 [default = false];
        optional int32 DetrendDegree                               = 7 [default = 1];  // detrend the input grid
        optional ctm.SetReferenceMagneticField IGRF = 9;
        optional int32 Number_CPUs                                 = 10 [ default = 1];  // here is the way to get more CPUs
into the act

        optional string FilteredGridName          =11 [ default ="filtered_grid.ers"];
        optional string FftGridName               =12 [ default = "fftGridName.ers"];  // input grid transformed to Fourier
coefficients
        optional string OutputFftGridName        =13 [ default = "OutfftGridName.ers"];  // this is the Fourier coeffiecents
grid
        optional string InputRadialPowerSpectrumReport=14 [ default = "inputRadial.rpt"];
        optional string OutputRadialPowerSpectrumReport=15 [ default = "outputRadial.rpt"];
        // options to keep intermediate grids
        optional string WindowedGridName          =16 [ default = "windowGrid.ers"];
        optional string ExpandedGridName          =17 [ default = "expandedGrid.ers"];
        optional string AmplitudeGridName         =18 [ default = "amplitudeGrid.ers"];
        optional string PhaseGridName                      =19 [ default = "phaseGrid.ers"];
        optional string CoefficientGridName       =20 [ default = "coefficientsGrid.ers"];
        optional int32 Band                       =21 [ default = 1];  // first band in a multi-band grid
        optional ctm.GridDataTypes OutputPrecision=22 [ default = IEEE4ByteReal];
        optional bool ReApplyTrendAfterReverseFft =23 [default = false]; // not an ordinary filter
        optional bool ApplyMaskAfterReverseFft    =24 [default = true];
        optional bool UseSymmetry                 =25 [default = true]; // save memory by using symmetry in coefficients
        optional diskUsageRules DiskUsageRule     =26 [default = AUTO];

        repeated fdf.FilterDescription_FDF filter          =27;  // access to special filter descriptions

// list of special, compound filtering options, all mutually exclusive of each other
        optional bool CalculateAnalyticSignal               = 30 [default = false];
        optional bool CalculateTiltAngle                           = 31 [default = false];
        optional bool CalculateTotalHorizontalTiltAngle = 32 [default = false];
        optional bool CalculateHorizontalDerivative = 33 [default = false];
        optional double HorizontalDegree                   = 34 [ default = 1.0];
        optional bool CalculateTensorIntegration            = 35 [default = false];
        optional bool CalculateFalconTransform              = 36 [default = false];
        optional bool ScaleTensorIntegration               = 37 [default = false];  // units change from EOTVOS to mGal,
scale by 10000
        //  here is a leading edge compound option  hilbert pair and the convolution theorem... Trouble!!
        // avoid for now
        optional bool LowPassFalconIntegration              = 38 [default = false];  // anti-alias filter for falcon before
integration
                // stuff for tensor filtering
        optional ctm.Tensor_Integration_Method InputTensorComponents = 40 [default = INT_XZ_YZ_ZZ];
        optional ctm.Falcon_FFT_TRANSFORM_Option RequiredFalconTransform = 41 [default = FALCON_TZ];
        optional ctm.Falcon_Reading_Options RequiredFalconQuery = 42 [default = FALCON_AVERAGE];
        optional ctm.CoordinateReferenceSystem InputGridCoordSysType = 43 [default = END]; // for vector/tensor fields
        optional string ToolName = 99 [default = "gfilt"];
}
```

Key points of this guided tour

- In a previous guided tour you saved a job file from an interactive session.

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- In this guided tour you have used the INTREPID batch system to streamline a repetitive task by
  - Editing the existing job file to specify a new task then
  - Executing the job in batch mode.
- You could also reload the edited job file in an interactive session to execute the new task or further reconfigure the job file.
- You can run job files from the command line without launching the interactive tool.
- You can write and edit your own job files using any text editor.
- You can manage repetitive 'production line' activities in conjunction with operating system scripting languages.

Frequently Asked Questions

Q : Does the batch system support argument substitution?

A : Yes.The Euler Deconvolution reference manual shows such an example.

Q : Does the batch system support repeat loops?

A : Yes. The Euler Deconvolution reference manual shows such an example.

Q : Can I monitor the progress of the batch job while it is running?

A : Yes. INTREPID provides a log file report for Windows and a terminal report for UNIX / LINUX. INTREPID produces an audit trail for ALL of its processes.

Q : How can I check on the syntax of my job file?

A : Try loading the job file into the tool and examine the log file for diagnostic information. At V5.0, check the formal specification of the language directly in the ***intrepid_tasks.proto*** *file.*

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